



California Regional Water Quality Control Board

San Francisco Bay Region



Terry Tamminen
Secretary for
Environmental
Protection

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Arnold Schwarzenegger
Governor

Date **AUG 04 2004**
File No. 1538.01 (CEB)

Certified Mail No. 70032260000212621918

Mr. Donald P. Freitas
Program Manager
Contra Costa Clean Water Program
255 Glacier Drive
Martinez, CA 94553

**SUBJECT: ORDER R2-2004-0059 AMENDING THE CONTRA COSTA
COUNTYWIDE NPDES MUNICIPAL STORMWATER PERMIT FOR
THE CONTRA COSTA CLEAN WATER PROGRAM**

Don
Dear Mr. Freitas:

On July 21, 2004, the Regional Water Quality Control Board, San Francisco Bay Region, adopted Order R2-2004-0059, amending the Contra Costa Countywide NPDES municipal stormwater permit for the Contra Costa Clean Water Program. We thank you, the Program, and the Permittees' staff for all the work toward writing the enclosed Order and making it accurately reflect the current state of permit implementation. We look forward to continuing the dialogue with you as we enter permit reissuance activities.

If you have any questions, please contact Christine Boschen of my staff at (510) 622-2346 or ceb@rb2.swrcb.ca.gov.

Sincerely,

orig

Bruce H. Wolfe
Bruce H. Wolfe
Executive Officer

Enclosure:

- Fact Sheet
- Adopted NPDES Permit, Order R2-2004-0059

cc (with enclosure):

- Mailing List

Contra Costa Clean Water Program Contacts Mailing List

Updated July 2004

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REGION FIVE CONTRA COSTA CITIES (NOT UNDER OUR JURISDICTION)

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

ORDER NO. R2-2004-0059

NPDES PERMIT NO. CAS0029912

AMENDMENT REVISING ORDER NO. 99-058, AS AMENDED, FOR:

CONTRA COSTA COUNTY, CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, CITY OF CLAYTON, CITY OF CONCORD, TOWN OF DANVILLE, CITY OF EL CERRITO, CITY OF HERCULES, CITY OF LAFAYETTE, CITY OF MARTINEZ, TOWN OF MORAGA, CITY OF ORINDA, CITY OF PINOLE, CITY OF PITTSBURG, CITY OF PLEASANT HILL, CITY OF RICHMOND, CITY OF SAN PABLO, CITY OF SAN RAMON, CITY OF WALNUT CREEK, which have joined to form the CONTRA COSTA CLEAN WATER PROGRAM.

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter referred to as the Regional Board), finds that:

FINDINGS

1. Incorporation of Fact Sheet: The Fact Sheet for the Contra Costa Clean Water Program NPDES Permit Amendment includes cited references and additional explanatory information in support of the requirements of this Amendment. This information, including any supplements thereto, and any future response to comments on the Tentative Order, is hereby incorporated by reference.
2. Existing Orders:
 - The Regional Board adopted Order No. 99-058 (the Permit) on July 21, 1999, reissuing waste discharge requirements under the National Pollutant Discharge Elimination System (NPDES) for Contra Costa County, Contra Costa County Flood Control and Water Conservation District, and the sixteen cities and towns in the County, as named above (hereinafter referred to collectively as the Dischargers and individually as the Discharger).
 - On February 19, 2003, the Regional Board adopted Order No. R2-2003-0022, amending Provision C.3 (New and Redevelopment Component) to the Permit.
3. In August 1999, the San Francisco BayKeeper and Just Economics for Environmental Health filed petitions for review of Order No. 99-058 by the State Water Resources Control Board (the State Board). After careful consideration, the State Board dismissed the petitions on April 4, 2001.

4. In 2001, San Francisco BayKeeper filed a lawsuit in San Francisco County Superior Court challenging the Regional Board's adoption of the Permit. On November 14, 2003, the Court upheld the permit on most counts; however, it issued a Writ of Mandate requiring the Regional Board to amend the Permit in compliance with the Court's Statement of Decision, which held:
 - (a) The Permit fails to include a monitoring program and must therefore specify required monitoring including type, interval, and frequency sufficient to yield data which are representative of the monitored activity;
 - (b) Because the Stormwater Management Plan (Plan) is incorporated and is deemed an integral part of the Permit, modifications to the Plan are modifications to the Permit and have to go through a public notice and comment process unless the modifications are minor; and
 - (c) The Regional Board, not the Executive Officer, must approve substantive modifications to the Plan.

This Order is therefore necessary to amend the Permit and to comply with the Court's Writ of Mandate.

5. In accordance with the Permit provisions, there have been some administrative revisions to the Plan that were not subjected to a public process and Board action contrary to the Court's Statement of Decision. Therefore, this Order formally rescinds and vacates those unauthorized Plan revisions, which are described in the separate order referenced below. The Board will act to formally adopt these revisions and any other pending requests for Plan revisions by a separate order to be considered at the same hearing date this amendment is considered for adoption.
6. The Dischargers' monitoring program plans, which include programmatic monitoring and watershed assessment and monitoring, are outlined Attachment A, "The Contra Costa Monitoring and Assessment Plan (CCMAP)", Attachment B, "Summary of Monitoring Activities Described in the CCMAP", and Attachment C, "Programmatic Monitoring Table" (collectively, the Monitoring Requirements) of this amendment. This amendment will add the Monitoring Requirements to the Permit, as required by the Court. The Monitoring Requirements will be re-evaluated and revised as necessary to provide data representative of the stormwater discharge at the time the Permit is ready for reissuance.
7. This action to modify an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Division 13 of the Public Resources Code, Chapter 3, Section 21100, et.seq.) in accordance with Section 13389 of the California Water Code.
8. The Dischargers and interested agencies and persons have been notified of the Regional Board's intent to modify waste discharge requirements for the existing discharge and have been provided opportunities for public meetings and to submit their written views and recommendations.

9. The numbering of the provisions of Order No. 99-058 was shifted from C.3 – C.15 to C.4 – C.16 when Provision C.3 was added by Order No. R2-2003-022 in 2003. This amendment employs the revised numbering.

IT IS HEREBY ORDERED that the Dischargers, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder and the provisions of the Clean Water Act as amended and regulations and guidelines adopted hereunder, shall comply with the following revisions:

Any and all administrative changes to the Plan that have been made under the terms of the Permit that were not subject to a public process or Regional Board action are hereby rescinded and vacated and the following Permit provisions are modified as follows and shown in redline/strike-out format:

Finding 19 of Order No. 99-058: The Regional Board will notify interested agencies and persons of the availability of reports, plans, and schedules, including Annual Reports, Work Plans, Performance Standards, and the Plan, and will provide them with an opportunity for a public hearing and/or opportunity to submit written views and recommendations. The Regional Board will consider all comments and may modify the reports, plans, or schedules or may modify this Order in accordance with the NPDES permit regulations. ~~All submittals required by the Order conditioned with acceptance by the Executive Officer will be subject to these notifications, comment, and public hearing procedures.~~

C.2. In accordance with Provision C.1 and Finding 12, the dischargers shall submit a technical report to the Regional Board on exceedances of WQS for copper, nickel, mercury, chlordane, DDT, dieldrin, PCBs, dioxin, and diazinon. A draft scope of work, report acceptable to the Executive officer outline, and budget for the report(s) shall be submitted by November 1, 1999. An interim draft report shall be submitted by April 1, 2000, and a final report shall be submitted by September 1, 2000. The reports shall include, but need not be limited to, the following:

- a) Identification of potential sources for pollutants of concern that are found in stormwater discharges;
- b) Evaluation of effectiveness of BMPs that are currently being implemented and additional BMPs that will be implemented to prevent or reduce the above listed pollutants that are causing or contributing to the exceedance of WQSs;
- c) Characterization of representative drainage areas and stormwater discharges, including land-use characteristics, pollutant concentrations and forms; and loadings; and;

- d) A pollution prevention and control measures plan for pollutants listed above ~~that is acceptable to the Executive Officer~~, which assigns responsibilities and establishes time schedules to implement pollutant reduction and control measures beginning no later than July 1, 2001. Upon approval by the ~~Executive Officer~~ Regional Board, the revised control measures plan shall be incorporated into the Stormwater Management Plan, in accordance with C.12.

C.6 (formerly C.5). Annual Reports: The dischargers shall submit an Annual Report, by September 1, of each year, documenting the status of the Program's and the Dischargers' activities during the previous fiscal year, including the results of a qualitative field level assessment of activities implemented by the Dischargers, and the performance of tasks contained in the Plan. The Annual Report shall include a compilation of deliverables and milestones completed as described in the Plan. In each Annual Report, the Dischargers may propose pertinent updates, improvements, or revisions to the Plan, which the Regional Board shall act ~~shall be complied with under this Order unless disapproved by the Executive Officer or acted upon in accordance with Provision C.12.~~ As part of the Annual Report preparation process, each of the Dischargers shall conduct an overall evaluation of the effectiveness of its applicable activities described in the Plan. Direct and indirect measures of effectiveness may include, but are not limited to, conformance with established Performance Standards, quantitative monitoring to assess the effectiveness of BMPs, measurements of estimates of pollutant load reductions, detailed accounting of Program accomplishments, funds expended, and staff hours utilized. Methods to improve effectiveness in the implementation of tasks and activities, including development of new, or modification of existing Performance Standards and/or development of new performance standards shall be identified where appropriate.

C.8 (formerly C.7). The Executive Officer may approve the Program's aAnnual rReport format; however, as set forth in Provision C.6, the Regional Board shall act on Annual Reports that propose to modify the Plan as Plan modifications in accordance with Provision C.12. ~~shall be deemed to be final and incorporated into the Plan and enforceable under this Order as of July 1 of each year unless determined to be unacceptable by the Executive Officer.~~ The Dischargers shall address any comments or conditions of acceptability received from the Executive Officer on the Program's aAnnual rReport format, prior to the submission of their Annual Report on September 1 of each year, or at an earlier date if so specified by the Executive Officer. ~~, at which time the annual report format shall be deemed to be incorporated into the Plan and this Order, unless disapproved of by the Executive Officer~~

C.9 (formerly C.8). The Dischargers shall comply with the Monitoring Requirements provided in Attachments A, B, and C of this Order, which are incorporated herein by this reference. Reports on the progress and results of the Monitoring Requirements shall be submitted yearly with the Annual Reports. Monitoring Program: The Dischargers shall submit, by September 1 of each year, an annual Monitoring Program Plan acceptable to the Executive Officer that supports the development and

~~implementation and demonstrates the effectiveness of their Plan. The Monitoring Program Plan shall be designed to achieve the following objectives:~~

- ~~• Characterization of representative drainage areas and stormwater discharges, including land use characteristics, pollutant concentrations, and mass loadings;~~
- ~~• Assessment of existing or potential adverse impacts on beneficial uses caused by pollutants of concern in stormwater discharges, including an evaluation of representative receiving waters;~~
- ~~• Identification of potential sources of pollutants of concern found in stormwater discharges; and~~
- ~~• Evaluation of effectiveness of representative stormwater pollution prevention or control measures.~~

~~The Monitoring Program Plan shall include the following:~~

- ~~a. Provisions for conducting and reporting the results of special studies conducted by the CCCWP or Dischargers which are designed to determine effectiveness of best management practice or control measures, define a Performance Standard or assess the adverse impact of a pollutant or pollutants on beneficial uses.~~
- ~~b. Provisions for conducting watershed monitoring activities including: identification of major sources of pollutants of concern; evaluation of the effectiveness of control measures and best management practices; and use of physical, chemical, and biological parameters and indicators as appropriate.~~
- ~~c. Identification and justification of representative sampling locations, frequencies and methods, suite of pollutants to be analyzed, analytical methods, and quality assurance procedures. Alternative monitoring methods in place of these (special projects, financial participation in regional, state, or national special projects or research, literature review, visual observations, use of indicator parameters, recognition and reliance on special studies conducted by other programs, etc.) may be proposed with justification. Alternative monitoring methods may include participation in Bay Area Stormwater Management Agencies Association's Monitoring Programs or Projects.~~

C.11 (formerly C.10). a. Non-Stormwater Discharges (Exempted Discharges): In carrying out Discharge Prohibitions A.1 and A.2 of this Order, the following non-stormwater discharges are not prohibited unless they are identified by the Discharger or the Regional Board Executive Officer as sources of pollutants to receiving waters:

- flows from riparian habitats or wetlands;
- diverted stream flows;
- springs;
- rising groundwater; and
- Uncontaminated groundwater infiltration.

If any of the above categories of discharges, or sources of such discharges, are identified as sources of pollutants to receiving waters, then such categories or sources shall be addressed as conditionally exempted discharges in accordance with Provision C.11.b.

b. Conditionally Exempted Discharges: The following non-stormwater discharges are not prohibited if they are either identified by the Discharger or the Regional Board Executive Officer as not being sources of pollutants to receiving waters or if appropriate control measures to minimize the adverse impacts of such sources are developed and implemented under the Stormwater Management Plan in accordance with Provision C.11.c.:

- uncontaminated pumped groundwater;
- foundation drains;
- water from crawl space pumps;
- footing drains;
- air conditioning condensate;
- irrigation water;
- landscape irrigation;
- lawn or garden watering;
- planned and unplanned discharges from potable water sources;
- water line and hydrant flushing;
- individual residential car washing; and
- discharges or flows from emergency fire fighting activities;
- dechlorinated swimming pool discharges.

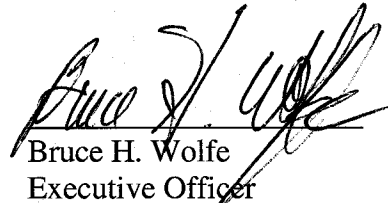
c. The Dischargers shall identify and describe the categories of discharges listed in C.11.b which they wish to exempt from Prohibition A.1 in periodic submissions to the Regional Board Executive Officer. For each such category, the Discharger shall identify and describe as necessary and appropriate to the category either documentation that the discharges are not sources of pollutants to receiving waters or circumstances in which they are not found to be sources of pollutants to receiving waters. Otherwise, the Discharger shall describe control measures to reduce pollutants that will eliminate the adverse impacts of such sources, procedures and Performance Standards for their implementation, procedures for notifying the Regional Board of these discharges, and procedures for monitoring and record management. The Regional Board shall act on such submissions and incorporate any approved exempted categories and control and implementation measures shall be deemed to be incorporated into the Plan unless disapproved by the Executive Officer or acted on in accordance with Provision C.12 and the NPDES permit regulations.

d. Permit Authorization for Exempted Discharges

- i. Discharges of non-stormwater from sources owned or operated by the Discharger are authorized and permitted by this Order, if they are in accordance with the conditions of this provision and the Plan.
- ii. The Regional Board may require dischargers of non-stormwater other than the Discharger to apply for and obtain coverage under an NPDES permit and comply with the control measures developed by the Discharger pursuant to Provision C.11. Non-stormwater discharges that are in compliance with such control measures may be accepted by the Discharger and are not subject to Prohibition A.1.
- iii. The Discharger may propose, as part of their annual updates to the Plan under Provision C.6 of this Order, additional categories of non-stormwater discharges to be included in the exemption to Discharge Prohibition A.1. Such proposals are subject to approval only by modification of this permit.

C.12 (formerly C.11) It is anticipated that the Plan may need to be modified, revised, or amended from time to time to respond to new information, changed conditions and to incorporate more effective approaches to pollutant control. Requests for changes may be initiated by the Executive Officer or by the Dischargers. Any such changes to the Plan, which is an integral and enforceable part of this Order as set forth in Finding No. 7 of Order No. 99-058, will be made in accordance with applicable State and federal regulations for permit modifications. Minor changes may be made with the Executive Officer's approval and will be brought to the Regional Board as information items and the Dischargers and interested parties will be notified accordingly. If proposed changes involve major revision of the Program, the Executive Officer shall bring such changes before the Regional Board as permit amendments and notify the Dischargers and interested parties accordingly.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 21, 2004.


Bruce H. Wolfe
Executive Officer

Attachment A: The Contra Costa Monitoring and Assessment Plan (CCMAP)
Attachment B: Summary of Monitoring Activities Described in the CCMAP
Attachment C: Programmatic Monitoring Table

Fact Sheet

CONTRA COSTA CLEAN WATER PROGRAM
ORDER NO. R2-2004-0059
AMENDMENT OF NPDES PERMIT NO. CAS0029912

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
1515 CLAY STREET, 14TH FLOOR
OAKLAND, CA 94612

I. Permit History

- A. Contra Costa County, Contra Costa County Flood Control and Water Conservation District, City of Clayton, City of Concord, Town of Danville, City of El Cerrito, City of Hercules, City of Lafayette, City of Martinez, Town of Moraga, City of Orinda, City of Pinole, City of Pittsburg, City of Pleasant Hill, City of Richmond, City of San Pablo, City of San Ramon, and City of Walnut Creek (hereinafter Dischargers), have joined together to form the Contra Costa Clean Water Program (hereinafter Program). On July 21, 1999, the California Regional Water Quality Control Board for the San Francisco Bay Region (hereinafter referred to as the Regional Board) re-issued waste discharge requirements (NPDES Permit No. CAS0029912, Order No. 99-058, hereinafter Permit) under the National Pollutant Discharge Elimination System (NPDES) to the Program to discharge stormwater runoff from storm drains and watercourses within the Dischargers' jurisdictions by complying with the Permit and implementing the Permit's associated Stormwater Management Plan (hereinafter Plan).
- B. On February 19, 2003, the Regional Board adopted Order No. R2-2003-0022, amending Provision C.3 (New and Redevelopment Component) of the Permit.
- C. Order Nos. 99-058 and R2-2003-0022 recognize the Program's Plan as the Dischargers' comprehensive control program and requires implementation of the Plan. The Plan describes a framework for management of stormwater discharges. Pursuant to Provisions in Order No. 99-058, the 1999 Plan has been administratively modified since then and describes the Program's goals and objectives and contains Performance Standards, which represent the baseline level of effort required of each of the Dischargers. The Plan contains Performance Standards for five different stormwater management components, including watershed assessment and monitoring.
- D. In August 1999, the San Francisco BayKeeper and Just Economics for Environmental Health filed petitions for review of Order No. 99-058 by the State

II. Discharge Description and Location:

The Dischargers each have jurisdiction over and/or maintenance responsibility for their respective municipal separate storm drain systems and/or watercourses in the Contra Costa County basin. The basin can be divided into several sub-basins or watersheds including: Wildcat, San Pablo, Pinole, Rodeo, Alhambra, Walnut, Pine, Alameda, San Lorenzo, and San Leandro Creek. Discharge consists of the surface runoff generated from various land uses in all the hydrologic sub basins in the basin which discharge into watercourses, which in turn flow into San Francisco Bay. The quality of the discharge varies considerably and is affected by hydrologic, geologic, land use, season, and sequence and duration of hydrologic events.

III. Rationale for Amendment of NPDES Permit No. CAS0029912

A. In 2001, San Francisco BayKeeper filed a lawsuit in San Francisco County Superior Court challenging the Regional Board's adoption of the Permit. On November 14, 2003, the Court upheld the permit on most counts; however, it issued a Writ of Mandate requiring the Regional Board to amend the Permit in compliance with the Court's Statement of Decision, which held:

1. The Permit fails to include a monitoring program and must therefore specify required monitoring including type, interval, and frequency sufficient to yield data which are representative of the monitored activity;
2. Because the Stormwater Management Plan (Plan) is incorporated and is deemed an integral part of the Permit, modifications to the Plan are modifications to the Permit and have to go through a public notice; and
3. The Regional Board, not the Executive Officer, must approve substantive modifications to the Plan.

This Order is therefore necessary to amend the Permit and to comply with the Court's Writ of Mandate.

B. In response to the November 14, 2003, Court Decision, this Order therefore amends existing Order No. 99-058, as amended in 2003, NPDES Permit No. CAS0029912 (the Permit) to:

1. Specify the monitoring requirements, including type, interval, and frequency sufficient to yield data which are representative of the monitored activity;
2. Add language that requires all modifications to the Permit, including the Plan, undergo a public notice and comment process in accordance with applicable law; and
3. Remove language that delegates authority to the Executive Officer to approve substantive modifications to the Plan, and specify instead that the Regional Board approve all such modifications.

Additionally, the Order rescinds and vacates any and all past administrative changes to the Plan that have been made under the terms of the Permit that were not subject to a public process or Regional Board action, as the Court held that changes to the Plan must be subjected to the public notice and comment and that the Executive Officer may not approve amendments to the Permit, which would include the Plan.

- C. Pursuant to 40 CFR sections 124.5.c.2 and 122.62 only those conditions to be modified by this amendment shall be reopened with this amendment. All other aspects of the existing permit shall remain in effect and are not subject to modification by this amendment.

IV. Written Comments

The formal written comment period for this Tentative Order to amend an existing Permit will **open on May 17 and close at 5 PM on June 18, 2004**. Comments on the Tentative Order shall be addressed to:

Regional Water Quality Control Board
1515 Clay Street, 14th Floor
Oakland, California 94612
Attn.: Christine Boschen

Or

FAX: (510) 622-2460
e-mail: ceb@rb2.swrcb.ca.gov

A preliminary draft of the Tentative Order was circulated for comment on February 19, 2004. That draft and the one comment received by WaterKeeper is part of the administrative record for this matter and the Regional Board will consider and respond to the comment received when it prepares a Response to Comments for comments received for this Tentative Order.

V. Public Hearing

The Board will consider the Tentative Order, and any proposed changes thereto based on public comments, at its July 21, 2004, meeting. The meeting will be held at::

**July 21, 2004
9:00 A.M.**

Elihu M. Harris Building

**First Floor Auditorium
1515 Clay Street
Oakland, CA 94612**

VI. Additional Opportunities to Comment on NPDES Permit No. CAS0029912

The purpose of this permit amendment is to comply with a court order. At this time, it is not the Regional Board's intention to open discussion on the adequacy of the current permit requirements. However, this permit is up for reissuance in 2004. There will be opportunities in the following months (dates and times to be announced) for the public to comment on the substance of the permit, in preparation for the permit reissuance. For more information, and to be placed on a notification list for this process, please contact Christine Boschen at (510) 622-2346, e-mail: ceb@rb2.swrcb.ca.gov.

Attachment A

Monitoring Program Plan

The Contra Costa Monitoring and Assessment Plan (CCMAP)

Submittal to:

San Francisco Bay Regional Water Quality Control Board

and

Central Valley Regional Water Quality Control Board

by:

Contra Costa Clean Water Program



September 30, 2003

Executive Summary

At the request of the San Francisco Regional Water Quality Control Board, the Contra Costa Clean Water Program has developed a water quality monitoring and assessment plan that was initiated within the Program's pilot watershed (Alhambra Creek) in Spring 2001. The Plan is intended to satisfy Monitoring Program Provisions C.8. and D.8. of the Program's Joint Municipal NPDES Permits, issued by the San Francisco Bay and Central Valley Regional Water Quality Control Boards, respectively. Building on the Creek Inventory Project conducted in Fiscal Year 1999/00 and previous special studies, the Contra Costa Monitoring and Assessment Plan (CCMAP) is a concise user-friendly monitoring plan used to assess watersheds and water quality within Contra Costa County. CCMAP's initial goals include; collecting baseline information necessary to identify and inevitably reduce/eliminate major sources of pollutants; developing a geographical information system (GIS); and providing a method to evaluate the effectiveness of control measures and Best Management Practices (BMPs). CCMAP entails further characterization of watersheds and sub-watersheds, and the development of strategically placed "fixed" monitoring stations where physical, biological, and basic chemical data will be collected and analyzed. Additionally, a volunteer training program and organized accessible water quality data information management system, accessible by Co-permittees, volunteers, and Program Staff, will be developed. In spring 2002, the Program again assessed the Alhambra Creek watershed, and three (3) additional watersheds, Pinole Creek, Upper Kellogg Creek, and Upper Marsh Creek. In spring 2003, the Program again assessed the Pinole Creek, Upper Kellogg Creek, and Upper Marsh Creek watersheds, assessed an additional watershed (Las Trampas Creek), and supported the Friends of Alhambra Creek in conducting bioassessments in Alhambra Creek. In future years, the Program intends to continue assessing additional watersheds throughout Contra Costa County using CCMAP methodology.

Contra Costa Clean Water Program

Monitoring Program Plan

September 30, 2003

Purpose:

As directed by the San Francisco Bay and Central Valley Regional Water Quality Control Boards (Boards), the Contra Costa Clean Water Program (Program) developed the Contra Costa Monitoring and Assessment Plan (CCMAP) to lead the Program's water quality monitoring and watershed assessment efforts. CCMAP is intended to satisfy the Monitoring Program Provision in each of the Program's Joint Municipal NPDES Permits (Permit). Permit provision C.8. issued by the San Francisco Bay Regional Water Quality Control Board, and Permit provision D.8. issued by the Central Valley Regional Water Quality Control Board. This strategy provides the Program with a working plan, designed to assess and monitor individual watersheds within Contra Costa County. The overall goal of the CCMAP is to identify and reduce/eliminate pollutants within Contra Costa's watersheds.

CCMAP is a "living" document, evolving along side other regional and State monitoring and assessment plans and strategies: Regional Monitoring and Assessment Strategy (RMAS), Regional Monitoring Program (RMP), BASMAA Regional Monitoring Strategy (BRMS) and Surface Water Ambient Monitoring Program (SWAMP). Additionally, CCMAP provides the vehicle necessary to achieve each of the following Monitoring Program Plan objectives, contained in the Program's Joint Municipal NPDES Permit

1. Characterization of representative drainage areas and stormwater discharges, including land-use characteristics, pollutant concentrations, and mass loadings
2. Assessment of existing or potential adverse impacts on beneficial uses caused by pollutants of concern in stormwater discharges, including an evaluation of representative receiving waters
3. Identification of potential sources of pollutants of concern found in stormwater discharges
4. Evaluation of effectiveness of representative stormwater pollution prevention or control measures

The first phase of CCMAP was initiated within our pilot watershed (Alhambra Creek) in FY 2000/01. Lessons learned from this pilot effort were used to refine CCMAP during FY 2001/02, when additional watershed assessments were conducted in Alhambra Creek, Pinole Creek, Upper Marsh Creek, and Upper Kellogg Creek watersheds; and in FY 2002/03, when watershed assessments were again conducted in Pinole Creek, Upper Marsh Creek, and Upper Kellogg Creek watersheds and an additional watershed was assessed (Las Trampas Creek).

The following Monitoring and Assessment Plan Components section provides an overview of tasks that were implemented in Fiscal Year 2002/2003 and tasks that are scheduled for implementation in Fiscal Year 2003/2004.

Monitoring and Assessment Plan Components:

Phase 1: Preliminary Development

CCMAP is a multi-phaseted watershed assessment and monitoring program. It utilizes Geographical Information System (GIS) technology, water quality database structure, systematic sampling site selection, physical habitat assessments, rapid bioassessments, and general chemical and physical water quality parameters. A description and current status of each Phase 1 task, and future tasks are described below.

Nomination of a "Monitoring Plan Advisor"

The Monitoring Plan Advisor is responsible for development, implementation, and general oversight of CCMAP. In Fiscal Year 2000/01 the Program's Monitoring and Inspection Committee nominated Mr. Chris Sommers, Watershed Management Planning Specialist, to hold this position. In Fiscal Year 2001/02 Mr. Sommers was the chief contact for CCMAP related tasks. Mr. Sommers coordinated watershed and sampling site selection; conducted reconnaissance at potential sites; facilitated access and sampling permit authorizations; managed CCMAP contractors; analyzed data and provided recommendations; and edited project reports.

Although Mr. Sommers resigned from his position as the Program's Watershed Management Planning Specialist in September 2002, he will continue to be actively involved in all aspects of CCMAP at least through Fiscal Year 2003/2004. Mr. Sommers will work closely with his successor in Fiscal Year 2003/2004 to assure the continued progress of CCMAP related tasks.

Define Specific Goals, Objectives, and Scope of CCMAP

The Program's Watershed Workgroup defined specific CCMAP goals and objectives in Fiscal Year 2000/01. These goals were carefully developed to not only guide CCMAP and satisfy Permit provisions (i.e. Reasonable Potential Analysis and Monitoring Program Plan) within the Program's NPDES permits, but to also satisfy the goals and objectives set forth in the many regional strategic plans (i.e. RMAS, RMP, BRMS). The goals of CCMAP are:

- To successfully characterize the "health" of individual watersheds within Contra Costa County;
- To prioritize sub-basins within individual watersheds, providing direction for future studies;

- Implementation of a long-term water quality monitoring plan using alternative methodologies;
- Development of a Program based Information Management System (IMS) and Geographical Information System (GIS) that will allow spatial watershed analyses to occur;
- To integrate volunteer resources into CCMAP's watershed assessments;
- To comply with the Program's Joint Municipal NPDES Permits issued by the Central Valley and San Francisco Bay Regional Water Quality Control Boards.

Collect and Compile Readily Available Data

The Program is currently collecting data associated with watersheds within the County. This information includes: data from Program-led scientific studies, watershed characteristics, land-use information, potential sources of pollution, maps, data from previous research by other agencies and organizations (e.g. SWAMP, RMP, CEP). Collected information will allow Program staff to better assess potential sources of stormwater pollution through existing data. This effort will also allow Program staff to determine where data gaps exist.

In Fiscal Year 2003/2004, the Program will continue to collect and compile readily available data in preparation for data entry once an information management system (IMS) is adopted.

Creek Inventory Map Creation

In Fiscal Year 1999/2000 the Program completed the preliminary mapping of watersheds within Contra Costa County. The maps defined watersheds, sub-basins within each watershed, man-made drainage networks, and hydrologic features and types. These maps were created with MicroStation software and are currently being converted to GIS format through a Creeks Inventory continuation project (See Fiscal Year 2003/2004 Annual Report Volume I – Section 8 – POC Source Assessment and Creeks Inventory). The continuation project, along with the countywide digital orthophotography images, is intended to build a foundation for future mapping efforts and provide a valuable resource in the Program's watershed assessments.

At the completion of the Creeks Inventory continuation project, the Program will have Geographic Information Systems (GIS) based maps for each watershed in the County. Each watershed map will include the following characteristics:

- Watershed and sub-watersheds area;
- Stream length;
- Stream tributaries and associated water bodies;
- Percentages and areas of various types of land uses;
- Designated beneficial uses;
- Average precipitation;
- High and low elevation;

- Number and location of assessment locations;
- Habitat conditions at assessment locations; and,
- A potential pollutant of concern list.

Adopt Physical, Chemical, and Biological Assessment Protocols

To properly assess watersheds in Contra Costa County, the Program adopted the State of California and Environmental Protection Agency (EPA) recognized California Rapid Bioassessment Protocol developed by the California Department of Fish & Game's Water Pollution Control Laboratory in Fiscal Year 2000/2001. The protocol uses benthic macroinvertebrate (BMI) community assemblages as the primary indicator of water quality and watershed "health". The attached protocol (Attachment A) describes field survey techniques, laboratory processes, and quality control/assurance. Additional assessment protocols will continue to be tested (see CCAMP Phase II – Watershed Field Surveys). Depending upon the results, the Program may adopt additional protocols as well.

Geographical Information System (GIS) Development

Working with the Contra Costa County Public Works and Community Development Departments, the Program is developing a comprehensive GIS system that will allow hydrological features, land use data, beneficial use information, topography, soil characteristics, impervious surfaces, county parcels, monitoring sites and water quality data to be spatially visualized. The Program currently has digital orthophotos of the entire county. Additionally, a GIS system will provide the program with tools necessary to perform watershed level assessments. Much of the relevant data and information collected under CCAMP will eventually be converted to GIS, allowing the Program to utilize a variety of information necessary to properly assess watersheds and reduce pollutants from entering the storm drain system (See Fiscal Year 2002/2003 Annual Report Volume I – Section 8 – POC Source Assessment and Creeks Inventory).

Information Management System (IMS) Development

In Fiscal Year 2001/2002, the Program spoke with a variety of public agencies (e.g. Department of Water Resources and SFB RWQCB) about the development of an organized and accessible information management system (IMS). Many agencies have adopted, or are currently adopting an IMS. It is the Program's intention to adopt an IMS that is consistent with the Central Valley and San Francisco Bay Boards' to allow data exchange.

The Program's IMS will house data collected for each watershed in the county and provide a valuable tool for Co-permittees to access watershed related information. It is the Program's intent to adopt an IMS and begin entering data in FY 2003/2004, in coordination with the Program's Proposition 13 grant (See Fiscal Year 2002/2003 Annual Report Volume I – Section 8 – Contra Costa Citizen Watershed Monitoring/Assessment

Program). Additionally, it is the Program's intention to link the IMS with the GIS system, allowing biological, physical, and chemical data to be integrated with currently available graphical data. The IMS will be housed on an independent server and in which all co-permittees will have access. Data entry will be conducted through the Program, to ensure the highest quality assurance and control protocols are implemented.

Phase 2: Implementation of CCMAP into Pilot Watershed (i.e. Alhambra Creek)

To properly test the watershed assessment protocols and methodology adopted by the Program, Alhambra Creek, Martinez, CA was chosen as the Program's pilot watershed. CCMAP was implemented into Alhambra Creek watershed in Fiscal Year 2000/2001. Building on the success of CCMAP in the Alhambra Creek watershed, the Program continued to assess Alhambra Creek watershed and expanded into three additional watersheds (Pinole Creek, Upper Marsh Creek, and Upper Kellogg Creek) in FY 2001/2002. In FY 2002/2003, the Program again assessed the Pinole Creek, Upper Kellogg Creek, and Upper Marsh Creek watersheds, assessed an additional watershed (Las Trampas Creek), and supported the Friends of Alhambra Creek in conducting bioassessments in Alhambra Creek.

Systematic Selection of Watersheds and Sampling Sites/Reaches

It is the Program's intent to create long-term assessment programs in a variety of Contra Costa County watersheds over the next few years. Through the Creeks Inventory Project, the Program has delineated roughly 30 watersheds of manageable size within the county. The Program's current group budget for field assessments (\$75,000) allows three (3) watersheds, based on 10 sites per watershed, to be assessed each fiscal year. Therefore, given the limited budget, the Program must only select watersheds of interest and potentially extrapolate the information gained within these watersheds to others that have not currently been selected for assessment. To facilitate the process of selecting watersheds, a list of selection criteria was created. Each winter the Program's Monitoring and Inspection Committee may chose to review the criteria and select additional watersheds for assessment in the following spring.

CCMAP currently assumes selected watersheds will be assessed by the Program for two (2) consecutive years. Following year two (2), it is the Program's goal to coordinate and facilitate a volunteer monitoring effort that will sustain a long-term assessment program within the selected watershed (See CCMAP Phase III - Volunteer Training and Volunteer-led Bioassessments). In FY 2001/2002, the Program applied for a Proposition 13 Grant to support volunteer-led bioassessments. In FY 2002/2003 the Program was notified that they had been awarded a grant of \$250,000. Through funding from the grant, the Contra Costa Citizen Watershed Monitoring/Assessment Program (Citizen Monitoring Program) will be created. Please see the Program's Fiscal Year 2002/2003 Annual Report, Volume I, Section 8 for more information.

Once watersheds are selected, sampling reaches/sites must be chosen. Rather than randomly choosing sampling sites throughout the watershed, a small number of "fixed"

sampling sites are strategically selected throughout the watersheds. Sites in essence divide the watershed into sub-basins by determining drainage patterns through topography and drainage inventory data. Sampling reach locations were determined by examining a variety of characteristics including upstream land uses, stream order, future degradation/recovery potential, BMP locations, and site accessibility. Information collected at these sites will help characterize each individual sub-basin that is delineated by sampling sites. Sampling sites selected at areas where valuable cost-effective information can be collected and analyzed will also help in determining changes (positive or negative) in beneficial uses and evaluate BMP effectiveness.

In Fiscal Year 2003/2004, the following watershed and sampling reach selection related tasks must be completed prior to the spring 2004 sampling period:

- Select two (2) additional watershed to conduct field surveys in Fiscal Year 2003/2004; and,
- Conduct reconnaissance on Las Trampas Creek and the additional two watersheds to select sampling reaches.

Potential Pollution Sources for Selected Sub-basins

A list of potential pollutant sources, based on land use and data generated from studies (i.e., PCO Source Assessment), is currently being developed for each watershed within the Contra Costa County. This list will create a broad list of potential pollution sources that can be systematically utilized if a particular type of impairment is evident in a particular sub-basin. Through the POC Source Assessment development, this list will be integrated into the Program's GIS and IMS systems to help characterize watershed health and determine a potential source(s) of impairment(s) within a given sub-basin.

Watershed Field Surveys

Biological Assessments

Biological assessments were conducted in spring 2001 at 10 sampling reaches within the Alhambra Creek watershed. In spring 2002 assessments were conducted in three (3) additional watersheds (Pinole, Upper Marsh, Upper Kellogg), while 10 reaches were again assessed in the Alhambra Creek watershed. A total of 29 sampling reaches were selected and assessed in the four (4) watersheds in Fiscal Year 2001/02. Eleven (11) sampling reaches were assessed in the Pinole Creek watershed, four (4) in the Upper Marsh Creek watershed, and four (4) in the Upper Kellogg Creek watershed. In spring 2003, the Program continued to expand CCMAP into additional watersheds in Contra Costa County. The Program sampled eleven (11) sites in Pinole Creek watershed, four (4) sites in the upper Marsh Creek watershed, two (2) sites in the upper Kellogg Creek watershed (i.e., Mallory Creek), and twelve (12) sites in the Las Trampas Creek watershed. The selection of sampling reaches and assessments in each watershed was coordinated with watershed stakeholders and volunteer monitors.

Bioassessments were conducted by Scott Cressey and Associates. Laboratory bioassessment analyses were conducted Dr. Richard Bartoff. Quality assurance procedures were conducted by the Department of Fish & Game, Aquatic Bioassessment Laboratory. A detailed report of the 2002 Rapid Bioassessment Project is available through the Program upon request. The 2003 report on Alhambra Creek, Pinole Creek, Upper Marsh Creek, Upper Kellogg Creek, and Las Trampas Creek watersheds will be available in winter/spring 2004, and included in the Program's Fiscal Year 2003/2004 Annual Report. Please see Attachment A for additional information on 2003 CCMAP activities.

Physical Habitat Assessments

Stream physical habitat assessments were conducted by Scott Cressey and Associates during bioassessments in spring 2001, 2002 and 2003 and will be conducted again in spring 2004. Assessments provide valuable information on potential stream habitat impacts. Physical Habitat Assessment Protocols are included in Attachment A. A revised CCMAP field worksheet is included in Attachment B.

Ambient Chemical Monitoring

Basic physical (temperature) and chemical (pH, D.O., conductivity) parameters were measured during field bioassessments in 2001, 2002 and 2003. Collected data will help Program Staff better understand the general water quality of Contra Costa streams and help provide background information needed to suggest future studies. Ambient chemical parameters will again be measure in selected watersheds in spring 2004.

Photo Documentation

In Fiscal Year 2001/02 the Program conducted a pilot photo documentation project. The project utilized the State Water Resource Control Board Clean Water Team's photo documentation protocol (Attachment C). A representative photo of each stream reach was digitally recorded where bioassessments were conducted. Field technicians used a handheld global positioning system (GPS) unit to record site locations at all photo documentation points. The protocol was deemed valuable in FY 2002/2003 and potentially useful in determining changes in the physical attributes of sampling reaches. The protocol was again used in spring 2003.

Streambed Substrate Composition

The Program also conducted a pilot streambed substrate composition project in Fiscal Year 2001/2002 to better quantify stream substrate composition and complexity. The project consisted of systematically measuring the size of streambed substrate material (e.g. sand, pebbles, cobbles, boulders) at each sampling reach. A worksheet was created by the Program to aid the field technician in recording substrate size. An evaluation of the protocols usefulness is included in the 2002 Rapid Bioassessment Report.

In summary, results indicated that there was no significant difference between that data collected from the two methodologies. Therefore, the comparison between methodologies indicates that qualitative assessments of substrate composition are an accurate estimate of substrate composition in riffles. Given these findings, in spring 2003 the Program decided to continue to conduct qualitative estimates of substrate composition, rather than measure quantitatively.

Data Entry

Collected data will be entered into the Program's IMS, following the adoption of and IMS structure. Quality control and assurance protocols will be followed to ensure highest quality data is entered into the IMS. Data will eventually be converted to the Program's GIS system, allowing more extensive watershed analysis to occur.

Data Analysis and Evaluation/Prioritization of Sub-basins

Following the second year of sampling and analysis of biological, physical, and chemical data collected in each selected watershed, particular geographical area(s) of concern within the watershed may be selected for a more focused study(s). These areas (sub-basins) will then be prioritized according to the extent of degradation and recovery potential. Distinguishing high priority sub-basins and referring to the relevant established potential source list, will allow the Program to focus resources (i.e. special studies and additional monitoring) on particular areas where recovery is possible.

Prioritization sub-basins within the Alhambra Creek watershed followed the completion of the 2002 bioassessment report in spring 2003. Data collected in 2001 and 2002 were analyzed and compared between adjacent sites to determine if significant changes in biological metrics were evident. Benthic macroinvertebrate (BMI) community composition data indicate that the following two areas within the watershed may be of interest to conduct additional studies:

- Lower Arroyo del Hambre (ADH) between sites ADH-2 & AHD-1 and,
- Lower Franklin Creek (FC) between FC-2 & FC-1.5.

Phase 3: Volunteer Training, Recommendations, and Continued Monitoring

Volunteer Training

As previously mentioned, CCMAP currently assumes Program selected watersheds will be assessed by the Program for two (2) consecutive years. Following year two (2), it is the Program's goal to support a volunteer monitoring effort that will sustain a long-term assessment program within a selected watershed. To facilitate the development of a long-term assessment program in a watershed, the Program intends to conduct a volunteer rapid bioassessment training workshop annually. Volunteers will receive training in the

previously mentioned rapid bioassessments, physical habitat analysis, and ambient chemical monitoring.

The Program conducted the First Annual Volunteer Rapid Bioassessment Training Workshop in April 2002. The training was performed by the Sustainable Land Stewardship Institute (SLSI) and Program staff. The Program conducted the Second Annual Volunteer Rapid Bioassessment Training Workshop in March 2003, which was also facilitated by SLSI. Approximately 25 people registered for the 2003 workshop, including volunteers from Kirker Creek, Alhambra Creek, Marsh Creek and San Pablo Creek watersheds. The workshop equipment and materials needed for training and fieldwork were provided by the Program. The Program intends to conduct the Third Annual Volunteer Rapid Bioassessment Training in Spring 2004.

Volunteer Led Bioassessments

Following two years of consultant-led bioassessments in Alhambra Creek, the Program supported the "Friends of Alhambra Creek" in conducting bioassessments in FY 2002/2003 at five (5) sites in the Alhambra Creek watershed. All sites were previously sampled in FY 2001/2002 by the Program. Fieldwork was conducted by volunteers and the Program provided on-hand support during data collection. To maintain data integrity, laboratory identification and quality control/assurance is currently being performed by professional entomologists. Data will be analyzed by the Program and provided/presented to the "Friends of Alhambra Creek" in FY 2003/2004.

In FY 2003/2004, the Program will continue to support volunteer-led bioassessments in Contra Costa County through the development and implementation of the Contra Costa Citizen Watershed Monitoring/Assessment Program (Citizen Monitoring Program), which will be created through Proposition 13 funding. Volunteer-led bioassessments are currently scheduled to be conducted in Alhambra Creek, Pinole Creek, Upper Marsh Creek, Wildcat/San Pablo Creek and Kirker Creek watersheds in FY 2003/2004 (depending on Proposition 13 contract completion date).

Recommendation of Future Studies in Sub-basins

Based on data generated from assessments and previous information, and the prioritization of sub-basins, Program Staff will suggest future studies aimed at determining particular sources of stormwater pollution in a given watershed. Future studies may include; more detailed biological surveys; mapping; chemical monitoring; toxicity testing; and extensive source identification through stormwater inspections and illicit discharge control activities.

Following the completion of the analysis of the Spring 2002 results, Program staff provided recommendations to the Watershed Assessment and Monitoring (WAM) committee to conduct follow-up studies in two areas of the Alhambra Creek watershed (i.e., Lower Arroyo del Hambre (ADH) between sites ADH-2 & AHD-1 and Lower Franklin Creek (FC) between FC-2 & FC-1.5) to determine if there are significant

differences between water quality parameters collected upstream and downstream of the areas in question. The Management Committee approved funding to conduct Alhambra Creek follow-up studies in FY 2002/2003. The studies will likely begin in Autumn or Winter 2003. Results will be included in the FY 2003/2004 Annual Report. A draft project plan is included the Program's Fiscal Year 2002/2003 Annual Report, Volume I, Section 8, Appendix "C" which describes the studies in more detail.

Development and Implementation of BMPs and Control Measures

Following sub-basin prioritization through the collection of data, particular pollutants and sources may be identified. This identification will allow Program Staff to suggest appropriate BMPs and control measures for particular pollutants in specific sub-basins. It is the Program's aim, through proper BMP implementation, to inevitably reduce pollutants from entering Contra Costa County waterways. Bioassessment or other techniques may be used to monitor implemented BMPs within a given watershed.

Reevaluation of Watersheds and CCMAP Methodology

To obtain adequate data and information needed to properly assess watershed "health" and determine BMP effectiveness, reevaluation of watersheds may be necessary. The Program is committed to making CCMAP a "living" methodology, which may need to be refined and refocused. The CCMAP methodology will evolve with new priorities and changes in the particular watershed being assessed.

Building on the Information Collected

Although data initially collected from the small number of sampling sites will only paint a rough picture of water quality and biological integrity within each individual watershed, the information gathered will provide a foundation for additional studies. Once the general condition of each sub-basin is determined, priority areas within the watershed can be identified and Program efforts more precisely directed towards smaller areas that may need immediate attention. This method will generate useful data needed to make management decisions and the allocate resources to particular geographical areas.

The Program intends to continue assessing watersheds in Contra Costa County using CCMAP methodology in future fiscal years. The Program has budgeted assessments on seven watersheds within the next three years. A tentative schedule of assessments, training, and analysis is included in Attachment D.

Integration with Regional and State Strategies

It is the Program's intent that CCMAP will complement Regional (RMP & RMAS) and State (SWAMP) monitoring and assessment efforts intended to reduce/eliminate pollutant loads from entering the San Francisco Estuary and it's tributaries. CCMAP will also

coordinate with and utilize information gained through Bay Area Stormwater Management Agencies Association (BASMAA) and Program sponsored special studies.

Available Resource Utilization

CCMAP will incorporate all available resources including: knowledge of stakeholders within each watershed, county land use maps, previously developed GIS data, special study information, data generated from regional assessments of particular pollutants (e.g. BASMAA's Mercury and PCB Study) and any additional valid information that can be obtained.

CCMAP Timeline

To successfully implement CCMAP into the Program's current monitoring strategies, a timeline describing the tasks discussed above is located in Attachment D. The timeline outlines beginning and completion dates for all tasks and indicates which tasks are currently complete.

CCMAP Deliverables

- A concise user-friendly monitoring plan used by the CCCWP to assess watersheds and water quality within Contra Costa County.
- A general picture of water quality within each Contra Costa County watershed, achieved through an assessment of general physical, biological, and ambient chemical parameters.
- A useful geographical information system (GIS) available to all Co-permittees.
- Base-line data available to determine recovery/degradation of beneficial uses and effectiveness of BMP implementation.
- Useful information regarding condition and character of watersheds within Contra Costa County.
- A vehicle necessary to pinpoint specific geographical areas of concern within individual watersheds and direct specific studies and Program resources.
- An organized accessible water quality information management system accessible by Co-permittees and Program staff.
- A volunteer training program designed to enable citizens to conduct bioassessments

Attachment "A"

2003 Rapid Bioassessment Scope of Work (SOW)

and

**California Department of Fish and Game Rapid Bioassessment
and Physical Habitat Assessment Protocols**

ATTACHMENT "A"
2003 RAPID BIOASSESSMENT PROJECT
SCOPE OF WORK

The consultant's scope of work for the CCMAP's 2003 Rapid Bioassessment Project (Project) includes the following responsibilities:

- Select and mark the benthic macroinvertebrate (BMI) sampling stations on new streams;
- Locate previously established BMI sampling stations on designated streams sampled in 2002 and refresh markers as needed;
- Select and mark a repeatable photo point at each BMI sampling station and take one digital photograph per station at the time of the BMI sampling;
- Sample macroinvertebrates at 28-33 designated stations following CSBP protocols;
- Process 10 randomly chosen samples with additional BMI for methods comparison;
- Supervise citizen volunteers in sampling four stations on Alhambra Creek;
- Record ambient water chemistry and Physical Habitat Assessment data at each macroinvertebrate station following the CSBP;
- Measure and record stream flow at each BMI sampling station during the macroinvertebrate samplings;
- Arrange and contract for laboratory processing and analysis of all macroinvertebrate samples, plus QA/QC samples;
- Prepare and submit a First Draft, Second Draft, and Final Report describing the methods and results of the 2003 sampling effort;
- Attend up to three meetings at the Program's office in Martinez; and
- Participate in the citizen volunteer training session in March, 2004.

STUDY AREA

Consultant responsibilities during the past two years of the CCMAP's Rapid Bioassessment Projects have included sampling 10 stations in the Alhambra Creek drainage. In 2003 this procedure will be modified as follows: four stations in this drainage will be sampled by citizen volunteers under the Consultant's supervision. In additions to supervising and assisting citizen volunteers in the Alhambra Creek drainage, the Consultant will be responsible for sampling the following drainages:

- Pinole Creek (2002 BMI stations PNL-1 through PNL-10 plus SI-1);
- Upper Marsh Creek (2002 BMI stations CUR-1, UMR-1, UMR-2, and UMR-3);
- Mallory Creek (2002 BMI stations MAL-1 and MAL-2); and
- Las Trampas Creek (10-12 new BMI stations).

SAMPLING METHODS

Methods for BMI community sampling, photographing sites, establishing coordinates, recording water quality characteristics, and characterizing the physical habitat of each BMI sampling reach will follow the protocols used during the Program's 2002 field effort. "Pebble counts", a

quantitative substrate measurement technique used in the 2002 effort, will not be employed during the 2003 study. The protocols for these methodologies are described in detail in the report entitled, "2002 Rapid Bioassessment Project" by Cressey & Associates and EOA, Inc. on file with the Contra Costa Clean Water Program.

SAMPLE PROCESSING

Sample processing and BMI identification will be conducted by qualified subconsultants. The BMI identification will be contracted to a specialist who participates in the California Bioassessment Laboratories Network (CAMLnet) and is approved for CSBP sample analysis by the Water Pollution Control Laboratory, California Department of Fish and Game (CDFG).

All BMI samples will be processed following CSBP protocols. In particular, organisms will be randomly selected from a grid until 300 macroinvertebrates have been removed. These organisms will be identified by a qualified entomologist using the *Level I Standard Taxonomic Effort* as described in the CSBP. The 2003 Project will differ from the 2002 effort in that a methods comparison will be incorporated into the sample processing. One randomly chosen sample from each of 10 stations sampled in 2003 will have an additional 200 macroinvertebrates removed for identification and enumeration following the standard procedure of removing 300 macroinvertebrates. This will allow a comparison of the results of working with 300 macroinvertebrates per sample versus 500 per sample.

Quality control and assurance (QA/QC) of laboratory identifications will be conducted by randomly selecting 10% of the samples collected and re-identifying the organisms contained within the voucher samples. QA/QC analysis will be conducted by a CDFG approved laboratory.

SCHEDULE

The 2003 BMI sampling will begin in late March or early April as dictated by flow conditions in the streams to be sampled. It is anticipated that sampling Alhambra Creek with the citizen volunteers will occur on weekends to accommodate their schedule. Unless unusual weather conditions occur, sampling will be completed by the end of April or shortly thereafter. The first draft Report will be submitted to the Contra Costa Clean Water Program for technical review by November 30, 2003. A second draft will be submitted within 15 calendar days of receiving comments on the first draft. A final report will be submitted no later than January 31, 2004. Participation in the citizen volunteer training session is anticipated to occur in March 2004.

PROJECT DELIVERABLES

The products submitted to the Program will consist of two draft versions and a final version of the report. The draft reports will be submitted to the Contra Costa Clean Water Program as one unbound copy of each. The Final Report will be submitted to the Program as five bound copies and one unbound reproducible copy.

CALIFORNIA STREAM BIOASSESSMENT PROCEDURE

(Protocol Brief for Biological and Physical/Habitat Assessment in Wadeable Streams)

The California Stream Bioassessment Procedure (CSBP) is a standardized protocol for assessing biological and physical/habitat conditions of wadeable streams in California. The CSBP is a regional adaptation of the national Rapid Bioassessment Protocols outlined by the U.S. Environmental Protection Agency in "Rapid Bioassessment Protocols for use in Streams and Rivers" (EPA 841-D-97-002). The CSBP is a cost-effective tool which utilizes measures of the stream's benthic macroinvertebrate (BMI) community and its physical/habitat characteristics to determine the stream's biological and physical integrity. BMIs can have a diverse community structure with individual species residing within the stream for a period of months to several years. They are also sensitive, in varying degrees, to temperature, dissolved oxygen, sedimentation, scouring, nutrient enrichment and chemical and organic pollution. Biological and physical assessment measures integrate the effects of water quality over time, are sensitive to multiple aspects of water and habitat quality and can provide the public with a familiar expression of ecological health.

The purpose of this Protocol Brief is to introduce the techniques of bioassessment to aquatic resource professionals and, hopefully, to encourage them to incorporate measures of biological and physical/habitat into their water quality programs. The use of this procedure will ensure that the data they generate can be used by state regulatory agencies and will be compatible with a statewide bioassessment effort. The Protocol Brief is only a summary and does not contain all the information that may be required to implement a bioassessment program. Additional information and updates on bioassessment can be obtained by visiting the California Aquatic Bioassessment Web Site at www.dfg.ca.gov/cabw/cabwhome.html.

CALIFORNIA DEPARTMENT OF FISH AND GAME SCIENTIFIC COLLECTING PERMIT

Anyone who collects fish, amphibians, or invertebrates from the waters of the state must have in their possession a DFG Scientific Collecting Permit. The permit can be obtained from the DFG License and Revenue Branch in Sacramento (916 227-2225). Those people conducting bioassessment in California should specify on the permit application, that they will take freshwater invertebrates (authorization 5) and incidental fish (authorization 6) and amphibians (authorization 8). It is also advisable to contact the local Game Warden and District Fisheries Biologist at the closest Regional Office prior to collecting. Starting in summer 1999, everyone indicating that they will be conducting bioassessment in California will receive the most recent version of the CSBP Protocol Brief and an Access⁷ database program to store, process and return a copy of the collected data.

FIELD PROCEDURES FOR COLLECTING BMI SAMPLES AND ASSESSING PHYSICAL/HABITAT QUALITY

The CSBP can be used to detect aquatic impacts from point and non-point sources of pollution and for assessing ambient biological condition. The sampling unit is an individual riffle or riffles within a reach of stream depending on the type of sampling design used. Riffles are used for collecting biological samples because they are the richest habitat for BMIs in wadeable streams. The BMI sampling procedures described in this Protocol Brief are intended for sampling wadeable, running water streams with available riffle habitats. There are approved modifications of this procedure for narrow (< 1m) streams, wadeable streams with sand or mud bottoms and channelized streams. There are also procedures for lentic or still water environments. Contact DFG or visit the California Aquatic Bioassessment Web Site for more information.

Point Source Sampling Design

There will be discernable perturbations, impacting structures or discharges into the stream with point sources of pollution. The sampling units will be individual riffles within the affected section of stream and an upstream unaffected section. At least one riffle in the unaffected section should be sampled and one or more riffles in the affected section depending on the amount of detail that is required on downstream recovery. The riffles used for sampling BMIs should have relatively similar gradient, substrate and physical/habitat characteristics and quality. One sample will be collected from 3 randomly chosen transects in each riffle.

Use the following step-by-step procedures for collecting BMIs using the point source sampling design:

FIELD EQUIPMENT AND SUPPLIES

- > Measuring tape
- > D-shaped kick net (0.5mm mesh)
- > Standard Size 35 sieve (0.5mm mesh)
- > Wide-mouth 500 ml plastic jars
- > White sorting pan and forceps
- > 95% ethanol
- > California Bioassessment Worksheet (CBW)
- > Physical/ Habitat Quality form
- > Chain of Custody form
- > Random number table
- > pH, temperature, DO and conductivity meter
- > Stadia rod and hand level/ clinometer
- > Densimeter/ Solar Pathfinder
- > GPS unit or watershed topographic map

Step 1. Place the measuring tape along the bank of the entire riffle while being careful not to walk in the stream. Each meter or 3 foot mark represents a possible transect location. Select 3 transects from all possible meter marks along the measuring tape using a random number table. Walk to the lowest transect before proceeding to Step 2.

Step 2. Inspect the transect before collecting BMIs by imagining a line going from one bank to the other, perpendicular to the flow. Choose 3 locations along that line where you will place your net to collect BMIs. If the substrate is fairly similar and there is no structure along the transect, the 3 locations will be on the side margins and the center of the stream. If there is substrate and structure complexity along the transect, then as much as possible, select the 3 collections to reflect it.

Step 3. After mentally locating the 3 areas, collect BMIs by placing the D-shaped kick-net on the substrate and disturbing a 1x2 foot portion of substrate upstream of the kick-net to approximately 4-6 inches in depth. Pick-up and scrub large rocks by hand under water in front of the net. Maintain a consistent sampling effort (approximately 1-3 minutes) at each site. Combine the 3 collections within the kick-net to make one composite sample.

Step 4. Place the contents of the kick-net in a standard size 35 sieve (0.5 mm mesh) or white enameled tray. Remove the larger twigs, leaves and rocks by hand after carefully inspecting for clinging organisms. If the pan is used, place the material through the sieve to remove the water before placing the material in the jar. Place the sampled material and label (see box) in a jar and completely fill with 95% ethanol. Never fill a jar more than 2/3 full with sampled material and gently agitate jars that contain primarily mud or sand.

Step 5. Proceeding upstream, repeat Steps 2 through 4 for the next two randomly chosen transects within the riffle.

Non-point Source Sampling Design

There will be no obvious perturbations or discharges into the stream with non-point sources of pollution. This sampling design is appropriate for assessing an entire stream or large section of stream.

The sampling units will be riffles within a reach of stream. The stream reach must contain at least 5 riffles within the same stream order and relative gradient. One sample will be collected from the upstream third of 3 randomly chosen riffles.

Bioassessment Sample Label

Riffle/ Reach Number: _____
Transect Number: _____
Stream Name: _____
Date/ Time: _____
Sample by: _____

Use the following step-by-step procedures for collecting BMIs using the non-point source sampling design:

Step 1. Randomly choose 3 of the 5 riffles within the stream reach using the random number table.

Step 2. Starting with the downstream riffle, place the measuring tape along the bank of the entire riffle while being careful not to walk in the stream. Select 1 transect from all possible meter marks along the top third of the riffle using a random number table.

Step 3. (See Point Source Sampling Design Step 2)

Step 4. (See Point Source Sampling Design Step 3)

Step 5. (See Point Source Sampling Design Step 4)

Step 6. Proceeding upstream, Repeat Steps 2 through 5 for the next two riffles within the stream reach.

Sampling Design for Assessing Ambient Biological Conditions

Assessment of ambient biological condition utilizes both the point and non-point source sampling designs to cover an entire watershed or larger regional area. Ambient bioassessment programs are used to evaluate the biological and physical integrity of targeted inland surface waters. Stream reaches should be established in the upper, middle and lower portions of each watershed and above and below areas of particular interest. Quite often bioassessment is incorporated into an existing chemical or toxicological sampling design. In most cases, the water quality information is being collected at a particular point on the stream. Although there will be the tendency to use the point source design, try to convert to a non-point reach design for biological sampling.

Measuring Physical/Habitat Quality

The physical/habitat scoring criteria is an EPA nationally standardized method. It is used to measure the physical integrity of a stream and can be a stand-alone evaluation or used in conjunction with a bioassessment sampling event.

DFG recommends that this procedure be conducted on every reach of stream sampled as part of a bioassessment program. Fill out the Physical/Habitat Quality Form for the entire reach where the BMI samples were collected as part of a non-point source sampling design. Some of the parameters do not apply to a single riffle, so this procedure is usually not performed as part of the point source sampling design. This procedure is an effective measure of a stream's physical/habitat quality, but requires field training prior to using it and implementation of quality assurance measures throughout the field season. A detailed description of the scoring criteria is available through the California Aquatic Bioassessment Web Site.

Measuring Chemical and Physical/Habitat Characteristics

Measurements of the chemical and physical/habitat characteristics are used to describe the riffle environment and help the water resource specialist interpret the BMI data. The information can be used to classify stream reaches and to explain anomalies that might occur in the data. They are not necessarily a good substitute for a quantitative fisheries habitat survey.

Use the following step-by-step procedures to measure chemical and physical/habitat characteristics:

Step 1. Water temperature, specific conductance, pH and dissolved oxygen should be measured at the sampling site using approved standardized procedures and instruments.

Step 2. Record the riffle length determine for the procedure to choose the transect locations. Estimate the average riffle width by averaging several measurements along its length. Measure the riffle depth by placing the stadia rod at several places within the riffle and averaging the measurements.

Step 3. Estimate or measure the entire length of the reach where the three riffles are chosen as part of the non-point source sampling design.

Step 4. Measure the riffle velocity using a flow meter placed in front of the three locations along the transect(s) where the BMI samples were collected. Average the readings.

Step 5. Estimate the percent of the riffle surface that is covered by shade from streamside vegetation (canopy cover) using a densiometer at several places along the riffle and averaging the readings.

Step 6. Determine substrate complexity and embeddedness by applying Parameters 1 and 2, respectively from the Physical/Habitat Quality Form to the riffle where the BMI sample was collected. Use the entire riffle to assess these parameters and make note if the area along the transect(s) is considerably different from the rest of the riffle.

Step 7. Visually estimate the percent of riffle in each of the following substrate categories: fines (<0.1 "), gravel (0.1-2"), cobble (2-10"), boulder (>10 ") and bedrock (solid). Use the entire riffle to assess this parameter and make note if the area along the transect(s) is considerable different from the rest of the riffle.

Step 8. Estimate substrate consolidation by kicking the substrate with the heel of your wader boots to note whether it is loosely, moderately or tightly cemented. The estimate should also take into consideration the hands-on experience obtained from collecting the BMI sample.

Step 9. Measure the gradient or slope of the riffle using a stadia rod and hand level or a clinometer.

Using the California Bioassessment Worksheet

A California Bioassessment Worksheet (CBW) should be filled out for each individual riffle when following the Point Source Sampling Design and for the entire reach when using the Non-point Sampling Design. Use the following step-by-step procedures for filling out the CBW:

Step 1. Enter the watershed and stream name, date and time of sample collection, name of the company or agency collecting the samples, sample identification number(s), and a short site description on the CBW.

Step 2. Enter the names of each crew member in the Crew Member Box.

Step 3. Determine the longitude and latitude coordinates and elevation from a GPS unit or watershed topographic map. Determine which California ecoregion or sub-ecoregion the site is located in by using the U.S. Forest Service map obtained by visiting the California Aquatic Bioassessment Web Site. Record this information and any other comments on the sampling site in the Site Location Box.

Step 4. Record the water temperature, specific conductance, pH and dissolved oxygen measurements in the Chemical Characteristics Box.

Step 5. Record the physical/habitat characteristics in the Riffle/Reach Characteristics Box. For the Point Source Sampling Design, record the riffle length, the 3 transect locations along the riffle and the physical/habitat characteristics information (starting with Ave. Riffle Width) on the lines below the Ariffle 1" column. For the Non-point Source Sampling Design, record the reach length, the total score from the Physical/Habitat Quality Form and all physical/habitat characteristics information on the lines below the Ariffle 1" through Ariffle 3" columns.

Step 6. Record the name and address of the Bioassessment Laboratory that received the samples along with the laboratory sample numbers if they are different than the field sample identification numbers.

Using the Chain of Custody (COC) Form

The Chain of Custody (COC) form is a necessary part of collecting BMI samples. It is an official document for tracking the samples from the field to the laboratory and then to their final storage area. The COC will also provide important information if samples are lost or misplaced. Use the following step-by-step procedures for using the COC:

Step 1. At the end of the field day, record the following information on the COC for each group of BMI samples: program name; watershed name; field ID numbers; sampling dates; and name, address, telephone number and signature of one of the crew members collecting the sample.

Step 2. Field samples and COCs must remain in a locked sample depository until a decision has been made to send them to a bioassessment laboratory for processing.

Step 3. When transporting to a bioassessment laboratory, each group of samples must be accompanied by a COC. Upon delivery, a Bioassessment Laboratory Number will be assigned to each sample. Record this number on the COC and each individual CBW along with the name and address of the bioassessment laboratory. When all samples listed on the COC are accounted for, then the individual delivering the samples will sign the "Released By" portion and the laboratory personnel will sign the "Received By" portion of the COC. The original COC will remain at the laboratory and a copy will be retained by the project supervisor.

PROFESSIONAL (LEVEL 3) LABORATORY PROCEDURES

The CSBP has three levels of BMI identification. Level 3 is the professional level equivalent and requires identification of BMIs to a standard level of taxonomy, usually to genus and/or species level. All professional Bioassessment Laboratories should belong to the California Bioassessment Laboratories Network (CAMLnet). This organization was conceived to provide technical assistance to laboratories and ensure that laboratory efforts are consistent throughout California. Contact DFG or visit the California Aquatic Bioassessment Web Site for information on CAMLnet.

LABORATORY EQUIPMENT

- > Dissecting microscopes
- > Standard Size 35 sieve (0.5 mm)
- > Gridded picking tray
- > Wide-mouth glass jars
- > Glass petri dishes
- > Vials
- > Taxonomic Keys
- > 70% EtOH/ 5% glycerol
- > Fine dissection forceps
- > Standardized taxonomic list
- > Waterproof paper/ pencils
- > Laboratory benchsheets
- > Random number generator
- > Chain of Custody form

Subsampling

Step 1. Retrieve the sample from the sample depository and cross-check the sample number with the bioassessment laboratory number on the COC.

Step 2. Empty the contents of the sample jar into the # 35 sieve (0.5 mm mesh) and thoroughly rinse with water.

Step 3. Once the sample is rinsed, clean and remove debris larger than 2 inch. Remove and discard green leaves, twigs and rocks. Do not remove filamentous algae and skeletonized leaves.

Step 4. After cleaning, place the material into a plastic tray marked with equally sized, numbered grids (approximately 2x2 inches). Do not allow any excess water into the tray. Spread the moist, cleaned debris on the bottom of the tray using as many grids necessary to obtain an approximate thickness of 2 inch. Make an effort to distribute the material as evenly as possible.

Step 5. Remove and count macroinvertebrates from randomly chosen grids until 300 BMIs are removed. Place the BMIs in a clean petri dish containing 70% ethanol/5% glycerin. Completely count the remaining organisms in the last grid but do not include them with the 300 used for identification. The final count should be recorded on the benchsheet for eventual abundance calculations.

Step 6. The debris from processed grids should be put in a clean Remnant® jar and the remaining contents of the tray should be placed back into the original sample jar. Both jars should be filled with fresh 70% ethanol, labeled (bioassessment laboratory number and either Aoriginal® or Aremnant®) and returned to the sample depository.

Identification of BMIs

Step 7. Identify the 300 BMIs from each sample to the standardized level recommended by CAMLnet using appropriate taxonomic keys.

Step 8. Place identified BMIs in individual glass vials for each taxon. Each vial should contain a label with taxonomic name, bioassessment laboratory number, stream, county, collection date and collector's name. This voucher collection should be labeled and returned to the Sample Depository.

Step 9. Record taxonomic information on a Macroinvertebrate Laboratory Bench Sheet. The bench sheet should include the following information: watershed or project name; sampling date; sample ID number; bioassessment laboratory number; date of subsampling; name of subsampler; remnant jar number; taxonomy completion date; name of taxonomist; taxonomic list of organism and enumeration; total number of organisms; total number of taxa; list of unknowns, problem groups and comments.

Step 10. Maintain a reference collection of representative specimens of all accurately identified BMI taxa.

QUALITY ASSURANCE (QA) PROCEDURES FOR THE FIELD AND LABORATORY

QA for Collecting BMIs

The CSBP is designed to produce consistent, random samples of BMIs. It is important to prevent bias in riffle choice and transect placement. The following procedures will help field crews collect unbiased and consistent BMI samples:

1. In using the CSBP, most sampling reaches should contain riffles that are at least 10 meters long, one meter wide and have a homogenous gravel/cobble substrate with swift water velocity. There are approved modifications of the CSBP when these conditions do not exist. Contact DFG or visit the California Aquatic Bioassessment Web Site for methods to sample narrow streams, wadeable streams with muddy bottoms and channelized streams.
2. A DFG biologist or project supervisor should train field crews in the use of the BMI sampling procedures described in the CSBP. Field personnel should review the CSBPs before each field season.
3. During the training, crew members should practice collecting BMI samples as described in the CSBP. The 2 ft² area upstream of the sampling device should be delineated using the measuring tape or a metal grid and the collection effort should be timed. Practice repeatedly until each crew member has demonstrated sampling consistency. Throughout the sampling season, assure that effort and sampling area remain consistent by timing sampling effort and measuring sampled area for approximately 20% of the sampling events. The results should be discussed immediately and need not be reported.

QA for Measuring Physical/Habitat Quality

Physical/habitat parameters are assessed using a ranking system ranging from optimal to poor condition. This rapid ranking system relies on visual evaluation and is inherently subjective. The following procedures will help to standardize individual observations to reduce differences in scores:

1. A DFG biologist or a project supervisor should train field crews in the use of the EPA physical/habitat assessment procedures. Contact DFG or visit the California Aquatic Bioassessment Web Site for a detailed description of the procedures. Field personnel should review these procedures before each field season.
2. At the beginning of each field season, all crew members should conduct a physical/habitat assessment of two practice stream reaches. Assess the first stream reach as a team and discuss in detail each of the 10 physical/habitat parameters described in the EPA procedure. Assess the second stream reach individually and when members are finished, discuss the 10 parameters and resolve discrepancies.
3. Crews or individuals assessing physical/habitat quality should frequently mix personnel or alternate assessment responsibilities. At the end of each field day, crew members should discuss habitat assessment results and resolve discrepancies.
4. The Project Supervisor should randomly pre-select 10 - 20% of the stream reaches where each crew member will be asked to assess the physical/habitat parameters separately. The discrepancies in individual crew member scores should be discussed and resolved with the Project Supervisor.

QA for the Laboratory

Laboratory analysis of macroinvertebrate samples can be a significant cost for bioassessment programs. The CSBP specifies identification of BMIs to a standard level of taxonomy, usually to genus and/or species level. The CSBP also requires subsampling procedures using a fixed count of 300 organisms. Employing these procedures with confidence requires an effective quality assurance program. Complete quality assurance compliance will require a

minimal 10% cost overhead. However, it will allow for testing whether subsampling, organism enumeration and taxonomic identification are consistent and accurate. Use the following procedures in the bioassessment laboratory to ensuring that quality data is produced:

The California Macroinvertebrate Laboratory Network (CAMLnet) - All individuals, private consulting firms and agency personnel using the CSBP laboratory procedures should contact the WPCL for information on CAMLnet. This group consists of personnel from bioassessment laboratories throughout California. The group provides a forum where laboratory procedures are discussed and the BMI taxonomic levels are determined. It also provides taxonomic workshops and assistance with interlaboratory taxonomic verification.

Standard Operation Procedures (SOP) - Each bioassessment laboratory should produce an SOP manual following the procedures outlined in the CSBP, but with detailed instructions specific to each laboratory. The SOP manual should be maintained for all laboratory operations and updated regularly. The assigned personnel and the duties of a Laboratory Supervisor and QA Taxonomist should be specified in the SOP manual. Customized benchsheets should be developed for each phase of subsampling and identification.

Sample Handling and Custody - When samples arrive, laboratory staff should inspect the samples for a sufficient volume of ethanol and labels for pertinent information including water-body name, sample date and time, location, transect number and sampler name. The steps discussed in the **Using the Chain of Custody (COC)** section in this protocol should be followed. The sample description information should be recorded in the Laboratory Sample Inventory Log and each sample given a unique identification number. A written and electronic record should be maintained to trace the samples from entry into the laboratory through final analysis. Samples should be stored in the a Sample Repository until processing and returned after processing.

Subsampling - Subsampling involves removing 300 organisms from each sample, or all organisms if the entire sample contains fewer than 300. The procedure to estimate abundance usually requires removing more than 300 organisms from each sample; however, only 300 are retained for identification. The Subsampling Technician systematically transfers organisms from the sample to a collection vial then transfers the processed sample debris (remnant) into a Remnant jar. At least 10% of the Remnant samples should be examined by the QA Taxonomist for organisms that may have been overlooked during subsampling. For subsamples containing 300 or more organisms, the Remnant sample should contain fewer than 10% of the total organisms subsampled. The Remnant for samples containing fewer than 300 organisms should contain fewer than 30 organisms.

Taxonomic Identification and Enumeration - The CSBP requires that all organisms are identified to a standardized taxonomic level using established taxonomic keys and references. The QA Taxonomist should check at least 10% of the samples for taxonomic accuracy and enumeration of individuals within each taxon. The same sample numbers that were selected randomly for the subsampling quality control should be used for this procedure. Misidentifications and/or taxonomic discrepancies as well as enumeration errors should be noted on the laboratory benchsheets. The Laboratory Supervisor determines if the errors warrant corrective action.

Organism Recovery - During the sorting and identification process organisms may be lost, miscounted or discarded. Taxonomists will record the number of organisms discarded and a justification for discarding on the laboratory benchsheets. Organisms may be discarded for several reasons including: 1) subsampler mistakes (e.g. inclusion of terrestrial or semi-aquatic organisms or exuviae), 2) small size (< 0.5 mm), 3) poor condition or 4) fragments of organisms. The number of organisms recovered at the end of sample processing will also be recorded and a percent recovery determined for all samples. Concern is warranted when organism recoveries fall below 90%. Samples with recoveries below 90% should be checked for counting errors and laboratory benchsheets should be checked to determine the number of discarded organisms. If the number of discarded organisms is high, then the technician that performed the subsampling should be informed and re-trained if necessary.

Corrective Action - Any quality control parameter that is considered out of range should be followed by a standard corrective action that includes two levels. Level I corrective action includes an investigation for the source of error or discrepancy derived from the quality control parameter. Level II corrective action includes checking all samples for the error derived from the quality control parameter but is initiated only after the results of the Level I process justify it. The decision to initiate Level II corrective action and reanalyze samples or conduct quality control on additional samples should be made by the Laboratory Supervisor.

Interlaboratory Taxonomic Validation - An external laboratory or taxonomic specialist should be consulted on a regular basis to verify taxonomic accuracy. External validation can be performed on selected taxa to help the laboratory taxonomists with problem groups of BMIs and to verify representative specimens of all taxa assembled in a reference collection.

Bioassessment Validation - The CSBP recommends at least 10% bioassessment validation where whole samples of 300 identified BMIs are randomly selected from all samples either for a particular project or for all samples processed within a set time period such as each 6 months or a year. The labels should be removed from the vials and replaced with a coded label that does not show the taxonomic name of the BMIs. The validation laboratory or specialist should be instructed to identify and enumerate all specimens in each vial and produce a taxonomic list. There will inevitably be some disagreements between the bioassessment and the external laboratory on taxonomic identification. These taxa should be re-examined by both parties and a resolution reached before a final QA report is written. DFG is working on this QA technique to determine the acceptable level of misidentification and appropriate corrective actions.

DATA DEVELOPMENT AND ANALYSIS

The CSBP analysis procedures are based on the EPA's multi-metric approach to bioassessment data analysis. The EPA is developing procedures for multi-variate analysis of bioassessment data, but that method is not presented here. However, the sampling protocols presented in this document were designed to facilitate the use of multi-variate analysis and more information will be presented when standardizes techniques for California become available.

A taxonomic list of the BMIs identified for each sample should be generated for each project along with a table of sample values and means for the biological metrics listed on the last page of this document. Variability of the sample values should be expressed as the coefficient of variability (CV). Significance testing can be use for point source sampling programs and ranking procedures can be used to compare sites sampled using the non-point sampling design (contact DFG for information on ranking formulas). Ultimately, there will be a regional Index of Biological Integrity (IBI) to compare sample site mean values.

Starting in summer 1999, an Access⁷ database program to store, process and return a copy of the collected data will be available. Contact DFG or visit the California Aquatic Bioassessment Web Site to learn more about the availability of regional IBIs and the database program.

Attachment “B”

CCMAP Field Survey Worksheet

Contra Costa Clean Water Program Bioassessment Worksheet

Watershed:

Date/Time: _____

Site ID #:

Site Description:

Crew Members:

[illegible]

Attachment “C”

State Water Resources Control Board - Clean Water Team's Photo Documentation Procedure

ATTACHMENT "C"

Standard Operating Procedure 5.2.3

Photo Documentation Procedure

Introduction:

Photographs provide a qualitative, and potentially semi-quantitative, record of conditions in a watershed or on a water body. Photographs can be used to document general conditions on a reach of a stream during a stream walk, pollution events or other impacts, assess resource conditions over time, or can be used to document temporal progress for restoration efforts or other projects designed to benefit water quality. Photographic technology is available to anyone and it does not require a large degree of training or expensive equipment. Photos can be used in reports, presentations, or uploaded onto a computer website or GIS program. This approach is useful in providing a visual portrait of water resources to those who may never have the opportunity to actually visit a monitoring site.

Equipment:

Use the same camera to the extent possible for each photo throughout the duration of the project. Either 35 mm color or digital color cameras are recommended, accompanied by a telephoto lens. If you must change cameras during the program, replace the original camera with a similar one comparable in terms of media (digital vs. 35 mm) and other characteristics. A complete equipment list is suggested as follows:

Required:

- Camera and backup camera
- Folder with copies of previous photos (do not carry original photos in the field)
- Topographic and/or road map
- Aerial photos if available
- Compass
- Timepiece
- Extra film or digital disk capacity (whichever is applicable)
- Extra batteries for camera (if applicable)
- Photo-log data sheets or, alternatively, a bound notebook dedicated to the project
- Yellow photo sign form and black marker, or, alternatively, a small black board and chalk

Optional:

- GPS unit
- Stadia rod (for scale on landscape shots)
- Ruler (for scale on close up views of streams and vegetation)

- Steel fence posts for dedicating fixed photo points in the absence of available fixed landmarks

How to Access Aerial Photographs:

Aerial Photos can be obtained from the following federal agencies:

USGS Earth Science Information Center
507 National Center
12201 Sunrise Valley Drive
Reston, VA 22092
800-USA-MAPS

USDA Consolidated Farm Service Agencies
Aerial Photography Field Office
222 West 2300 South
P.O. Box 30010
Salt Lake City, UT 84103-0010
801-524-5856

Cartographic and Architectural Branch
National Archives and Records Administration
8601 Adelphi Road
College park, MD 20740-6001
301-713-7040

Roles and Duties of Team:

The team should be comprised of a minimum of two people, and preferably three people for restoration or other water quality improvement projects, as follows:

1. Primary Photographer
2. Subject, target for centering the photo and providing scale
3. Person responsible for determining geographic position and holding the photo sign forms or blackboard.

One of these people is also responsible for taking field notes to describe and record photos and photo points.

Safety Concerns:

Persons involved in photo monitoring should ALWAYS put safety first. For safety reasons, always have at least two 2 volunteers for the survey. Make sure that the area(s) you are surveying either are accessible to the public or that you have obtained permission from the landowner prior to the survey.

Some safety concerns that may be encountered during the survey include, but are not limited to:

- Inclement weather
- Flood conditions, fast flowing water, or very cold water
- Poisonous plants (e.g.: poison oak)
- Dangerous insects and animals (e.g.: bees, rattlesnakes, range animals such as cattle, etc.)
- Harmful or hazardous trash (e.g.: broken glass, hypodermic needles, human feces)

We recommend that the volunteer coordinator or leader discuss the potential hazards with all volunteers prior to any fieldwork.

General Instructions:

From the inception of any photo documentation project until it is completed, always take each photo from the same position (photo point), and at the same bearing and vertical angle at that photo point. Photo point positions should be thoroughly documented, including photographs taken of the photo point. Refer to copies of previous photos when arriving at the photo point. Try to maintain a level (horizontal) camera view unless the terrain is sloped. (If the photo can not be horizontal due to the slope, then record the angle for that photo.) When photo points are first being selected, consider the type of project (meadow or stream restoration, vegetation management for fire control, ambient or event monitoring as part of a stream walk, etc.) and refer to the guidance listed on *Suggestions for Photo Points by Type of Project*.

When taking photographs, try to include landscape features that are unlikely to change over several years (buildings, other structures, and landscape features such as peaks, rock outcrops, large trees, etc.) so that repeat photos will be easy to position. Lighting is, of course, a key ingredient so give consideration to the angle of light, cloud cover, background, shadows, and contrasts. Close view photographs taken from the north (i.e., facing south) will minimize shadows. Medium and long view photos are best shot with the sun at the photographer's back. Some artistic expression is encouraged as some photos may be used on websites and in slide shows (early morning and late evening shots may be useful for this purpose). Seasonal changes can be used to advantage as foliage, stream flow, cloud cover, and site access fluctuate. It is often important to include a ruler, stadia rod, person, farm animal, or automobile in photos to convey the scale of the image. Of particular concern is the angle from which the photo is taken. Oftentimes an overhead or elevated shot from a bridge, cliff, peak, tree, etc. will be instrumental in conveying the full dimensions of the project. Of most importance overall, however, is being aware of the goal(s) of the project and capturing images that clearly demonstrate progress towards achieving those goal(s). Again, reference to *Suggestions for Photo Points by Type of Project* may be helpful.

If possible, try to include a black board or yellow photo sign in the view, marked at a minimum with the location, subject, time and date of the photograph. A blank photo sign form is included in this document.

Recording Information:

Use a systematic method of recording information about each project, photo point, and photo. The following information should be entered on the photo-log forms (blank form included in this document) or in a dedicated notebook:

- Project or group name, and contract number (if applicable, e.g., for funded restoration projects)
- General location (stream, beach, city, etc.), and short narrative description of project's habitat type, goals, etc.
- Photographer and other team members
- Photo number
- Date
- Time (for each photograph)
- Photo point information, including:
 - Name or other unique identifier (abbreviated name and/or ID number)
 - Narrative description of location including proximity to and direction from notable landscape features like roads, fence lines, creeks, rock outcrops, large trees, buildings, previous photo points, etc. – sufficient for future photographers who have never visited the project to locate the photo point
 - Latitude, longitude, and altitude from map or GPS unit
- Magnetic compass bearing from the photo point to the subject
- Specific information about the subject of the photo
- Optional additional information: a true compass bearing (corrected for declination) from photo point to subject, time of sunrise and sunset (check newspaper or almanac), and cloud cover.

For ambient monitoring, the stream and shore walk form should be attached or referenced in the photo-log.

When monitoring the implementation of restoration, fuel reduction, or Best Management Practices (BMP) projects, include or attach to the photo-log a narrative description of observable progress in achieving the goals of the project. Provide supplementary information along with the photo, such as noticeable changes in habitat, wildlife, and water quality and quantity.

Archive all photos, along with the associated photo-log information, in a protected environment.

The Photo Point: Establishing Position of Photographer:

1. Have available a variety of methods for establishing position: maps, aerial photos, GPS, permanent markers and landmarks, etc. If the primary method fails (e.g., a GPS or lost

marker post) then have an alternate method (map, aerial photo, copy of an original photograph of the photo-point, etc).

2. Select an existing structure or landmark (mailbox, telephone pole, benchmark, large rock, etc.), identify its latitude and longitude, and choose (and record for future use) the permanent position of the photographer relative to that landmark. Alternatively, choose the procedure described in *Monitoring California's Annual Rangeland Vegetation* (UC/DANR Leaflet 21486, Dec. 1990). This procedure involves placing a permanently marked steel fence post to establish the position of the photographer.
3. For restoration, fuel reduction, and BMP projects, photograph the photo-points and carry copies of those photographs on subsequent field visits.

Determining the Compass Bearing:

1. Select and record the permanent magnetic bearing of the photo center view. You can also record the true compass bearing (corrected for declination) but do not substitute this for the magnetic bearing. Include a prominent landmark in a set position within the view. If possible, have an assistant stand at a fixed distance from both the photographer and the center of the view, holding a stadia rod if available, within the view of the camera; preferably position the stadia rod on one established, consistent side of the view for each photo (right or left side).
2. Alternatively, use the procedure described in *Monitoring California's Annual Rangeland Vegetation* (UC/DANR Leaflet 21486, Dec. 1990). This procedure involves placing a permanently marked steel fence post to establish the position of the focal point (photo center).
3. When performing ambient or event photo monitoring, and when a compass is not available, then refer to a map and record the approximate bearing as north, south, east or west.

Suggestions for Photo Points by Type of Project:

Ambient or Event Monitoring, Including Photography Associated with Narrative Visual Assessments:

1. When first beginning an ambient monitoring program take representative long and/or medium view photos of stream reaches and segments of shoreline being monitored. Show the positions of these photos on a map, preferably on the stream/shore walk form. Subjects to be photographed include a representative view of the stream or shore condition at the beginning and ending positions of the segment being monitored, storm drain outfalls, confluence of tributaries, structures (e.g., bridges, dams, pipelines, etc.).
2. If possible, take a close view photograph of the substrate (streambed), algae, or submerged aquatic vegetation.

3. Time series: Photographs of these subjects at the same photo points should be repeated annually during the same season or month if possible.
4. Event monitoring refers to any unusual or sporadic conditions encountered during a stream or shore walk, such as trash dumps, turbidity events, oil spills, etc. Photograph and record information on your photo-log and on your Stream and Shore Walk Visual Assessment form. Report pollution events to the Regional Board. Report trash dumps to local authorities.

All Restoration and Fuel Reduction Projects – Time Series:

Take photos immediately before and after construction, planting, or vegetation removal. Long term monitoring should allow for at least annual photography for a minimum of three years after the project, and thereafter at 5 years and ten years.

Meadow Restoration:

1. Aerial view (satellite or airplane photography) if available.
2. In the absence of an aerial view, a landscape, long view showing an overlapping sequence of photos illustrating a long reach of stream and meadow (satellite photos, or hill close by, fly-over, etc.)
3. Long view up or down the longitudinal dimension of the creek showing riparian vegetation growth bounded on each side by grasses, sedges, or whatever that is lower in height
4. Long view of conversion of sage and other upland species back to meadow vegetation
5. Long view and medium view of streambed changes (straightened back to meandering, sediment back to gravel, etc.)
6. Medium and close views of structures, plantings, etc. intended to induce these changes

Stream Restoration/stabilization:

1. Aerial view (satellite or airplane photography) if available.
2. In the absence of an aerial view, a landscape, long-view showing all or representative sections of the project (bluff, bridge, etc.)
3. Long view up or down the stream (from stream level) showing changes in the stream bank, vegetation, etc.

4. Long view and medium view of streambed changes (thalweg, gravel, meanders, etc.)
5. Medium and close views of structures, plantings, etc. intended to induce these changes.
6. Optional: Use a tape set perpendicular across the stream channel at fixed points and include this tape in your photos described in 3 and 4 above. For specific procedures refer to Harrelson, Cheryl C., C.L. Rawlins, and John P. Potyondy, *Stream Channel Reference Sites: An Illustrated Guide to Field Techniques*, United States Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-245.

Vegetation Management for Fire Prevention ("fuel reduction"):

1. Aerial view (satellite or airplane photography) if available.
2. In the absence of an aerial view, a landscape, long view showing all or representative sections of the project (bluff, bridge, etc.)
3. Long view (wide angle if possible) showing the project area or areas. Preferably these long views should be from an elevated vantage point.
4. Medium view photos showing examples of vegetation changes, and plantings if included in the project. It is recommended that a person (preferably holding a stadia rod) be included in the view for scale
5. To the extent possible include medium and long view photos that include adjacent stream channels.

Stream Sediment Load or Erosion Monitoring:

1. Long views from bridge or other elevated position.
2. Medium views of bars and banks, with a person (preferably holding a stadia rod) in view for scale.
3. Close views of streambed with ruler or other common object in the view for scale.
4. Time series: Photograph during the dry season (low flow) once per year or after a significant flood event when streambed is visible. The flood events may be episodic in the south and seasonal in the north.

5. Optional: Use a tape set perpendicular across the stream channel at fixed points and include this tape in your photos described in 1 and 2 above. For specific procedures refer to Harrelson, Cheryl C., C.L. Rawlins, and John P. Potyondy, *Stream Channel Reference Sites: An Illustrated Guide to Field Techniques*, United States Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-245.

PHOTO- LOG FORM

Project:

Location:

Date:

Photographer:

Team members:

Photo #	Time	Photo Point ID	Photo Pt. Description & Location	Bearing to Subject	Subject Description

General Notes or Comments (weather, cloud cover, time of sunrise and sunset, other pertinent information):

PHOTO SIGN FORM: Print this form on yellow paper. Complete the following information in black marker for each photograph. Include in the photographic view so that it will be legible in the finished photo.

Location:

Subject Description:

Date:

Time:

Attachment “D”

Timelines for CCMAP Activities

ATTACHMENT D
CCMAP Implementation Timeline

Task	Start Date	Completion Date	Associated Report/Document	Dedicated Staff
<u>Phase I: Preliminary Development</u>				
1. Nomination of a "Monitoring Plan Advisor"	FY 2000/01	FY 2000/01	N/A	Program Staff
2. Define Specific Goals, Objectives, and Scope of CCMAP	FY 2000/01	FY 2000/01	Monitoring Program Plan	Watershed Workgroup
3. Collect and Compile Readily Available Data	On-going		N/A	Program Staff
4. Creek Inventory Map Creation	FY 1999/00	FY 2003/04	Watershed Atlas and Creek Inventory and Watershed	Contra Costa County
5. Adopt Physical, Chemical, and Biological Assessment Protocols	FY 2000/01	FY 2000/01	Characterization Report CSBP, Photo Documentation	Watershed Workgroup
6. Geographical Information System (GIS) Development	On-going		GIS Data Layers Table Protocol, etc.	Program Staff/Consultant
7. Information Management System (IMS) Development	FY 2002/03	FY 2004/05	N/A	Program Staff/Consultant
<u>Phase 2: Implementation of CCMAP into Pilot Watershed (Alhambra Creek)</u>				
1. Systematic Selection of Watersheds and Sampling Sites/Reaches	FY 2000/01	FY 2000/01	2001 and 2002 Rapid Bioassessment Reports	Program Staff/WAM Subcommittee
2. Potential Pollution Sources for Selected Sub-basins	FY 2002/03	FY 2002/03	2002 Rapid Bioassessment Report and Recommended Next Steps Memo	Program Staff
3. Watershed Field Surveys				
3a. Field Survey #1 (Biological, Physical and Ambient Chemical)	FY 2000/01	FY 2000/01	2001 Rapid Bioassessment Report	Program Staff/Consultant
3b. Field Survey #2 (Biological, Physical and Ambient Chemical)	FY 2001/02	FY 2001/02	2002 Rapid Bioassessment Report	Program Staff/Consultant
4. Data Entry	On-going		N/A	Program Staff/Consultant
5. Data Analysis and Evaluation/Prioritization of Sub-basins	FY 2001/02	FY 2001/02	2002 Rapid Bioassessment Report	Program Staff/WAMs Subcommittee

ATTACHMENT "D"
CCMAP Implementation Timeline

Task	Start Date	Completion Date	Associated Report/Document	Dedicated Staff
<u>Phase 3: Volunteer Training, Recommendations, and Continued Monitoring</u>				
1. Volunteer Training	On-going Annually		Workshop Announcements, Agendas and Attendance Sheets	Program Staff/Consultant
2. Volunteer Led Bioassessments	FY 2004/05	TBD	TBD	Program Staff/Consultant
3. Recommend and Conduct Follow-up Studies in Priority Sub-basins				
3a. Alhambra Creek Watershed	FY 2003/04	FY 2003/04	TBD	Program Staff/Consultant
3b. Pinole Creek Watershed	TBD		N/A	Program Staff/Consultant
4. Development and Implementation of BMPs and Control Measures	On-going		N/A	Program Staff/Consultant
5. Reevaluation of Watersheds and CCMAP Methodology	Annually		N/A	Program Staff/Consultant
6. Assessment of Additional Watersheds				
6a. Pinole Creek Watershed	FY 2001/02	FY 2002/03	2002 and 2003 Rapid Bioassessment Reports	Program Staff/Consultant
6b. Upper Marsh Creek Watershed	FY 2001/02	FY 2002/03	2002 and 2003 Rapid Bioassessment Reports	Program Staff/Consultant
6c. Upper Kellogg Creek Watershed	FY 2001/02	FY 2002/03	2002 and 2003 Rapid Bioassessment Reports	Program Staff/Consultant
6d. Las Trampas Creek Watershed	FY 2002/03	FY 2003/04	2003 Rapid Bioassessment Reports	Program Staff/Consultant

Attachment B **Summary of Monitoring Activities Described in the CCMAP**

Environmental Monitoring and Assessment - FYs 2003/04 and 2004/05

Type	Activity	Location	Number of Sample Sites	Parameters	Frequency/Interval
FY 2003/04					
Screening-level monitoring of receiving waters and impacts to beneficial uses.	Biological & Physical Habitat Assessments and Creek Water Quality Testing	Refugio/Rodeo/Port Costa Watersheds	10 to 12	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2004).
		Lower Marsh Creek subwatersheds	10 to 12	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2004).
		Las Trampas Creek Watershed	10 to 12	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2004).
		Alhambra Creek, Pinole Creek, San Pablo Creek, Wildcat Creek, Kirker Creek, Mt. Diablo Creek Watersheds ¹	4 to 6 sites in each watershed	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2004).

Type	Activity	Location	Number of Sample Sites	Parameters	Frequency/Interval
Investigative-level monitoring of potential pollutant sources.	Composite chemical water quality sampling and Toxicity Testing	Alhambra Creek Watershed	4	Organophosphate pesticides, chlorides, Major Anions (Orthophosphate, Nitrite Nitrogen, Nitrate Nitrogen, Chloride, Sulfate), Total Phosphate, TOC, DOC, SSC, TKN, Ammonia, Chlorophyll a, Alkalinity, Hardness, Nitrate, 3-species (<i>C. dubia</i> , <i>P. promelas</i> , <i>C. capricornutum</i>) freshwater chronic toxicity testing (5 dilution series)	Two episodes (spring and summer 2004).
	Chemical Water Quality sampling and Toxicity Testing	San Pablo Creek, Mt. Diablo Creek, Alamo/Tassajara Creek and Kirker Creek Watersheds	13	Nitrate, Nitrite, Ammonia, TKN, Total Phosphate, dissolved oxygen, conductivity, pH, 2-species (<i>C. dubia</i> , <i>P. promelas</i>) freshwater chronic toxicity testing (screening)	3 to 5 (winter, spring and summer).

Type	Activity	Location	Number of Sample Sites	Parameters	Frequency/Interval
FY 2004/05					
Screening-level monitoring of receiving waters and impacts to beneficial uses.	Biological & Physical Habitat Assessments and Creek Water Quality Testing	Refugio/Rodeo/Port Costa Watersheds	10 to 12	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2005).
		Lower Marsh Creek subwatersheds	10 to 12	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2005).
		Alhambra Creek, Pinole Creek, San Pablo Creek, Wildcat Creek, Kirker Creek, Mt. Diablo Creek Watersheds ¹	4 to 6 sites in each watershed	Benthic macroinvertebrate assemblages, physical habitat characteristics, substrate characterization, flow, dissolved oxygen, conductivity, pH, temperature, photo documentation .	One episode (spring 2004).
Investigative-level monitoring of potential pollutant sources.	Chemical Water Quality sampling and Toxicity Testing	San Pablo Creek, Mt. Diablo Creek, Alamo/Tassajara Creek and Kirker Creek Watersheds	13	Nitrate, Nitrite, Ammonia, TKN, Total Phosphate, dissolved oxygen, conductivity, pH, 2-species (<i>C. dubia</i> , <i>P. promelas</i>) freshwater chronic toxicity testing (screening)	1 to 3 (summer).

1 - These monitoring activities are partially funded by the Program through matching funds to the Proposition 13 Grant (Contra Costa Citizens Watershed Monitoring and Assessment Program) . Additionally, the Program is providing technical and administrative support for these activities.

Attachment C—Programmatic Monitoring Activities Table

Type of Monitored Activity	Parameters	Frequency	Documentation Methods	Reporting Interval
Municipal Government Maintenance Activities				
<i>Street sweeping</i>	Curb miles swept and volume of material removed by each Co-permittee.	Whenever streets are swept	Co-permittees municipal maintenance record keeping forms and Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Street Sweeping</i>	Estimated total quantity (weight) of copper, total petroleum hydrocarbons (TPH), lead and sediment removed from street sweeping activities by each Co-permittee.	Calculated Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Removal of material from storm drain system</i>	Total number of storm drain facilities ; number of storm drain facilities inspected; number of storm drain facilities cleaned; and, volume of material removed by each Co-permittee.	Whenever these activities are conducted	Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Municipal pesticide use</i>	Description of activities to implement Co-permittee's <i>Organophosphate Pesticide Reduction Plans</i> .	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Municipal pesticide use</i>	Total quantity of pesticides applied (lbs or gallons) by each Co-permittee; total quantity of pesticides applied with copper as an active ingredient by each Co-permittee; and, total quantity of pesticides applied with diazinon as an active ingredient by each Co-permittee.	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Municipal fertilizer use</i>	Total quantity of fertilizers applied (lbs or gallons) by each Co-permittee	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
<i>Training municipal staff on use of integrated pest management (IPM)</i>	Number of municipal staff who attended IPM training.	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report

Storm Drain Facilities include: inlets, culverts, v-ditches, pump stations, constructed channels, natural watercourses and trash racks.

Attachment C—Programmatic Monitoring Activities Table

Type of Monitored Activity	Parameters	Frequency	Documentation Methods	Reporting Interval
Industrial/Commercial Facility Inspection Activities				
Control of stormwater pollutants from commercial and industrial businesses	Number of businesses scheduled for inspection; number of businesses inspected; type of inspection (e.g., routine, follow-up, call-out); number of stormwater violations issued; and, number of enforcement actions.	Whenever a business is inspected	Program's Annual Reporting Table	Submitted as part of Annual Report
Training of staff on industrial/commercial stormwater inspections	Number of inspector training sessions and number of inspectors trained	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
Illicit Discharge Control Activities				
Activities to find illicit discharges	Field activities conducted, including: number of field screening areas identified; number of field screening areas inspected (high, medium and low priority areas); number and types of illicit discharges and illicit connections eliminated; number of illegal dumping hotspots identified during routine inspections; and, number of enforcement actions taken.	Whenever field activity is undertaken	Program's Annual Reporting Table	Submitted as part of Annual Report
Activities to respond to illicit discharges	For each illicit discharge found, information on the source of illicit discharge, type of illicit discharge, and follow up activities undertaken to stop the illicit discharge, including enforcement actions taken and informational material distributed	Whenever an illicit discharge is found or reported	County Environmental Health Incident Reports and Program's Annual Reporting Table	Submitted as part of Annual Report
Training of staff on illicit discharge inspections	Number of inspector training sessions and number of inspectors trained	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
Public Education and Outreach Activities				
Activities to educate residents, businesses and industry about stormwater	Description and number of community outreach events held or participated in to educate residents, businesses and industry about stormwater pollution problems and solutions including the proper management and disposal of used oil and toxic materials.	Whenever an event is held or participated in.	CCCWP's deliverable forms	Submitted as part of Annual Report

Attachment C—Programmatic Monitoring Activities Table

Type of Monitored Activity	Parameters	Frequency	Documentation Methods	Reporting Interval
Activities to educate residents, businesses and industry about stormwater	Quantity and type of public education materials distributed; Quantity and type of media outreach activities conducted; Quantity of calls received via 1-800-NO-DUMPING phone line.	Whenever materials are distributed, outreach activities are conducted, and calls are received.	Program's Annual Reporting Table	Submitted as part of Annual Report
Status of maintaining storm drain stencils and/or signs	Quantity of storm drain inlets stenciled or stamped; and, information confirming that storm drain inlet stencils/signs are being maintained as they wear out.	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
Activities to collect and properly dispose of household hazardous waste	Quantity (gallons) of household hazardous waste collected, including motor oil, household paint, pesticides and miscellaneous materials (e.g., antifreeze, fluorescent light bulbs, batteries).	When ever material is collected	Program's Annual Reporting Table	Submitted as part of Annual Report
New Development and Construction Control Activities				
Incorporation of stormwater quality controls into requirements for new development projects	Number of new, redevelopment and capital improvement projects issued a permit to begin construction; number of projects incorporating permanent structure control measures; and, number incorporating site planning and design measures for number of capital improvement projects	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
Control of erosion from construction sites in preparation for wet season	Total number of construction projects; number of projects active during the rainy season; number of projects covered under the State's General Construction Permit; number of pre-rainy season construction site inspections conducted and reported; number of violations; and, number of enforcement actions taken.	Prior to wet season starting and annually	Program's pre-rainy season construction inspection forms and Program's Annual Reporting Table	Submitted by October 15 th of each year and submitted as part of Annual Report
Control of erosion from construction sites during the wet season	Total number of rainy season inspections; total number of violations issued; and, total number of enforcement actions taken.	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report
Training municipal staff on construction site inspections	Information on the number of municipal staff that has completed training each year and the number that have certificates of completion from this training.	Annually	Program's Annual Reporting Table	Submitted as part of Annual Report